

September 23, 2019

Exhibit 8

Presentation to ETIC 9-23-19  
Mike Cashell – Vice President,  
Transmission, NorthWestern Energy

# MT Renewable Development Action Plan Update





## June 2018 - MRDAP – Significant Findings

1

Advocates for Montana renewables (state government, developers and public interest groups) are “pushing” the export of Montana renewables. There needs to be a corresponding interest from potential purchasers “pulling” for the acquisition of Montana renewables.

2

The delivered cost of Montana wind resources to Pacific Northwest utilities appears to be competitive with other renewable resources. However, uncertainties about transmission and integration services can be impediments to securing contracts for Montana wind resources.

3



There is (or will soon be) a significant amount of transmission capacity – from existing available capacity, the planned retirement of Colstrip units 1 and 2, and relatively low-cost (compared to building new lines, though still in the \$ millions) transmission upgrades – to support the development of a substantial quantity of Montana renewables for export to the Pacific Northwest, but not necessarily all the way to the Interstate-5 (I-5) load centers.

4

Some segments of unused transmission system capacity exist today (Table 1, page 13).

5



Transmission system capacity will become available as coal-fired generation at Colstrip retires (see Table 2, page 13).



# June 2018 - MRDAP – Significant Findings

6

Assuming transmission service requests to pay for the investments, incremental available transmission capacity can be added with three projects (Table 2):

- a. BPA Remedial Action Scheme (RAS) installations - ~ \$2 million per site
- b. Colstrip Transmission Upgrade - ~\$252 million
- c. Montana-to-Washington Project - ~\$140 million

7

The Montana Intertie Agreement (MIA), originally conceived and written to move Colstrip generation to loads, has provisions that may need to be modified to facilitate future use of capacity on the BPA Eastern Intertie and the Colstrip Transmission System (CTS). BPA and the CTS parties agree that CTS parties can use their existing capacity rights under the MIA to move power they acquire other than Colstrip power, but some modification to the MIA is required to provide for third-party wheeling.

8



The existing transfer capability of the Colstrip Transmission System can, with relatively minor investments (compared to new line builds), support a one-for-one replacement of Colstrip generation with new resources, including variable energy resources.





# June 2018 - MRDAP – Significant Findings

9



As long as the Colstrip 500-kV transmission system remains intact and with proper enhancements, steady state and dynamic studies indicate new transmission lines are not required to reliably maintain high transfer capability.

10



The 500-kV system is also essential for reliable load service both within Montana and for supporting exports to the Pacific Northwest.

11

New generation must participate in Remedial Action Schemes, or RAS, the ability to quickly drop generation to protect the stability of the transmission system, and coordinate with the Colstrip Transmission System Acceleration Trend Relay (ATR) as long as the ATR or its replacement are required for the operation of the transmission system.

12



Under steady state conditions, review of the publicly available studies performed to date did not identify thermal limit violations for any of the Colstrip retirement scenarios considered. None of the studies identified new transmission lines as being required (as long as the 500-kV system is intact) in order to support the integration of new resources, including variable energy resources.

13

Review of the available studies that conducted dynamic stability analysis also found that the system performed reliably under stress, with no voltage excursions. Specific location and resource design will be reviewed for any necessary frequency response when replacement generation is identified.



# June 2018 - MRDAP – Significant Findings

14



Adequate voltage support in local areas may be a concern following Colstrip generation retirement. However, the location of replacement generation may help address it. Voltage control can be provided by a number of means, including generators, switched capacitors and reactors, static VAR compensators, pumped storage, or synchronous condensers.

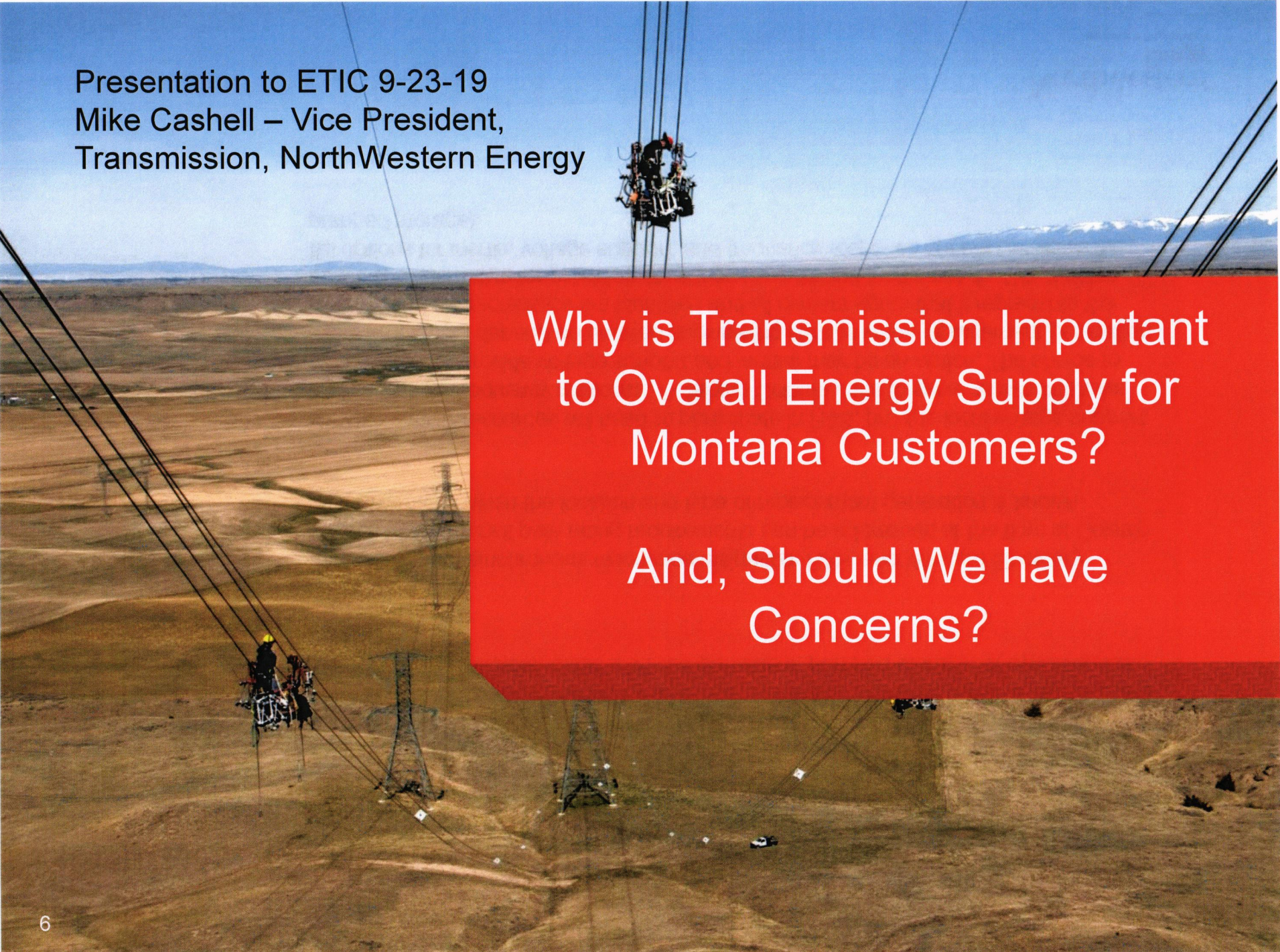
15

Blackstart, sub-synchronous resonance mitigation, RAS, and Western Electricity Coordinating Council path rating requirements can be addressed at the time of Colstrip unit retirements when the location and type of replacement generation is known.

16

Variable energy resources will need to participate in RAS, provide local voltage support and potentially frequency response. Retaining Colstrip units to serve as synchronous condensers (to provide voltage support and inertia) may be an option. The choice to exercise it would depend on detailed engineering studies when replacement generation location and characteristics are identified and all owners agree that it represents the best value alternative for provision of voltage support and inertia needs. Other potential options for inertia, voltage support, and frequency response are also available (i.e., pumped storage).





Presentation to ETIC 9-23-19  
Mike Cashell – Vice President,  
Transmission, NorthWestern Energy

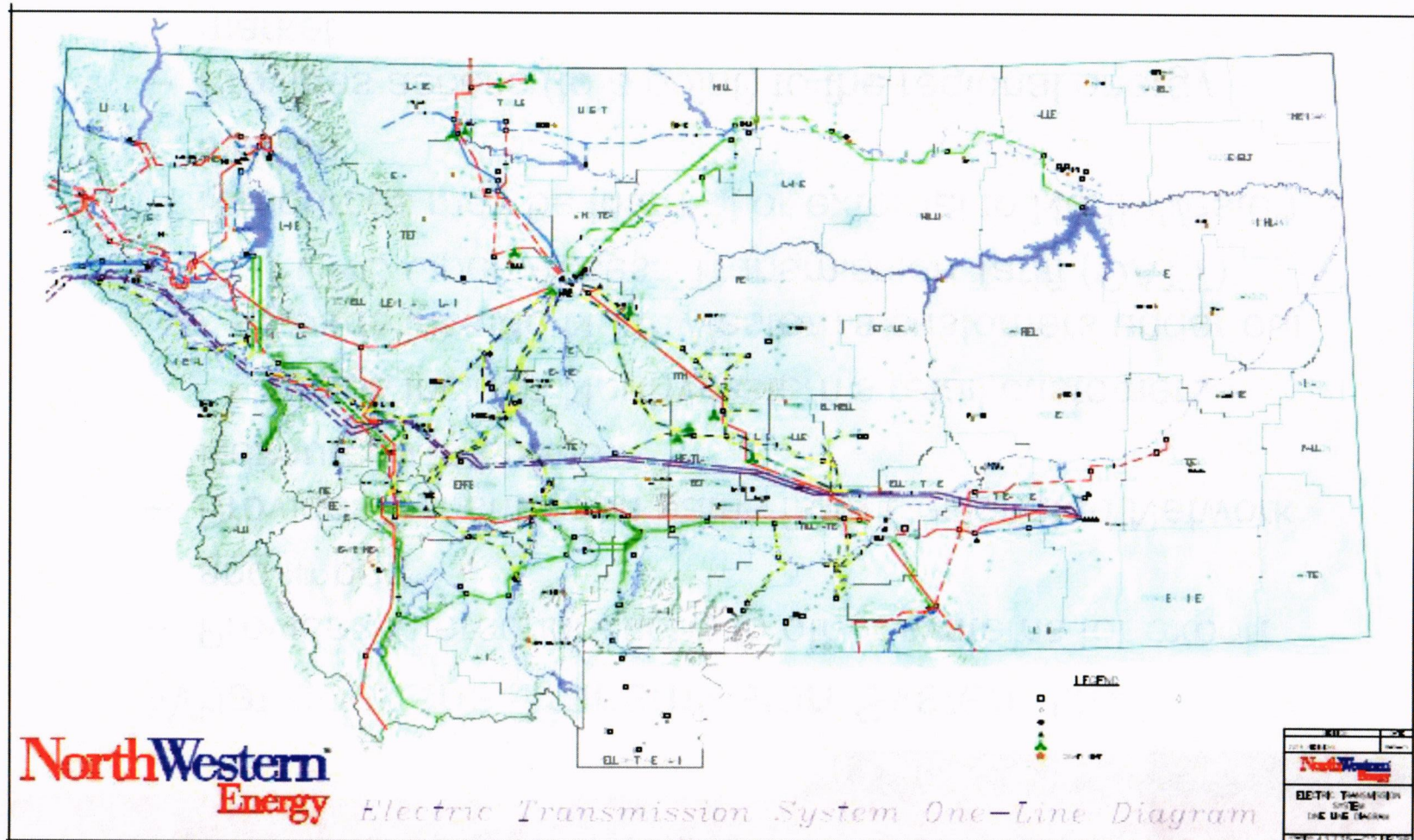
Why is Transmission Important  
to Overall Energy Supply for  
Montana Customers?

And, Should We have  
Concerns?





# NorthWestern's Transmission System







# The Basics about Transmission

- What does the Transmission System Do?
  - Provides interconnections to other systems for export and import
  - Provides transmission paths from Designated Network Resources to Loads
    - Loads include NorthWestern's retail customers
    - Loads include NorthWestern's customers under our FERC Open Access Transmission Tariff (OATT)
  - Resources may be internal or external to NorthWestern's system
  - Provides access (to a point) to the regional energy market
  - Provides pathway through and out of Montana (PTP)
  - Assures Reliability – Resources and Loads must be in constant balance





# Why a Discussion about Transmission?

- Why is a transmission discussion important?
  - Transmission and generation are linked - designed to operate together, each supporting the other
    - Transmission System designed around existing generation
  - Transmission capacity is not unlimited
  - Transmission to and from markets can, and does, become “congested”
  - New, large loads on transmission system
  - A series of new, all-time Peak Loads on Transmission System
  - Unexpected curtailments or contingencies can, and do, occur





## What Customers Does the Transmission System Serve?

- Retail Bundled Customers served by NorthWestern Energy
- Network Customers under NorthWestern's FERC OATT
  - Cooperatives
  - "Choice" Customers
  - Federal Agencies such as BPA, WAPA
- Power Marketers and others that take Point-to-Point Transmission service under the OATT
- Independent Power Producers





# Concepts and Definitions

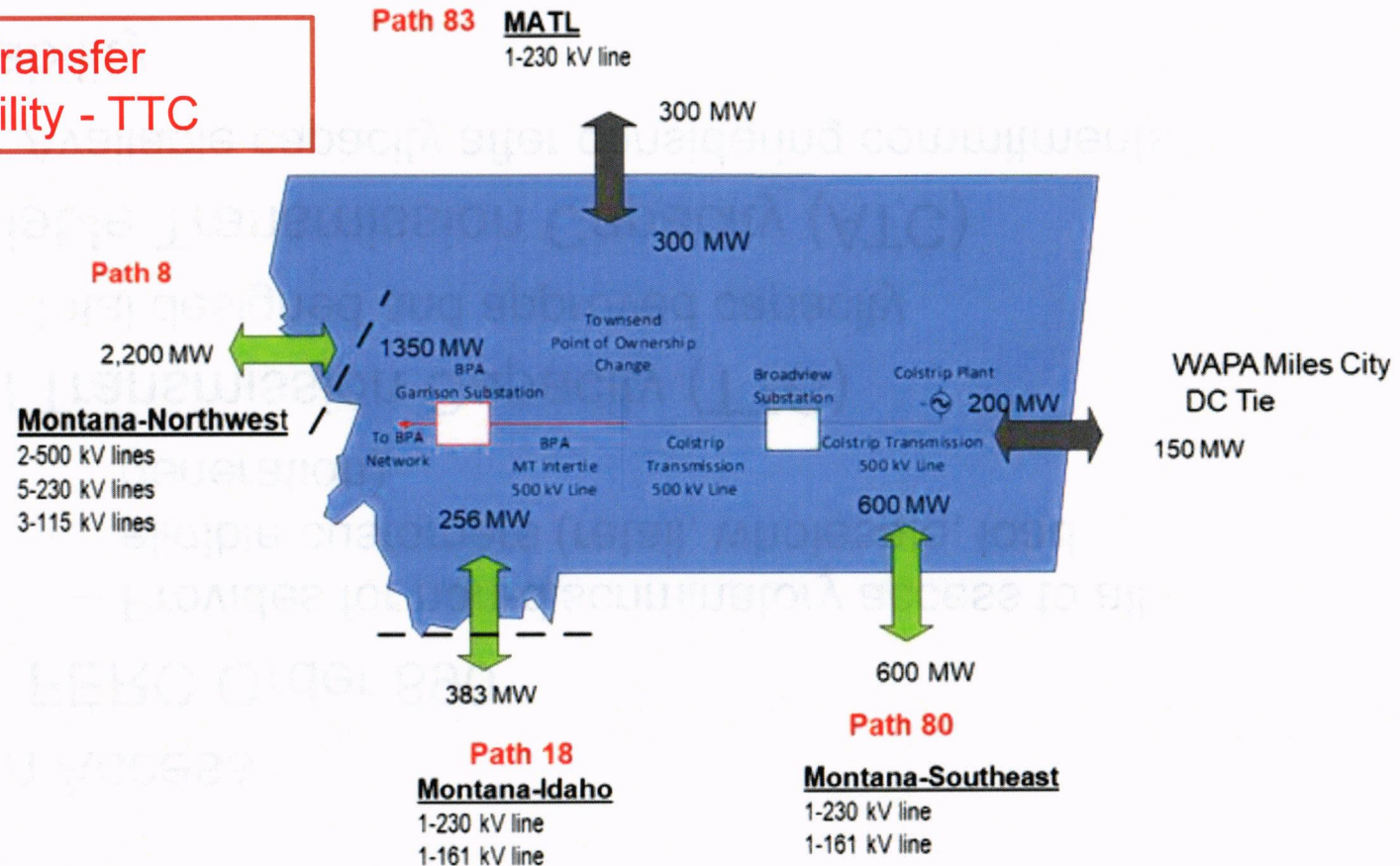
- Open Access
  - FERC Order 890
    - Provides for non-discriminatory access to all eligible customers (retail, wholesale, load, generation)
- Total Transmission Capacity (TTC)
  - Total designed and approved capacity
- Available Transmission Capacity (ATC)
  - Available capacity after considering commitments
- Reliability
  - Adequacy and Security of the transmission system to operate properly under stressed conditions
- BAA – Balancing Authority Area





# Total Transfer Capability - TTC

Total Transfer  
Capability - TTC



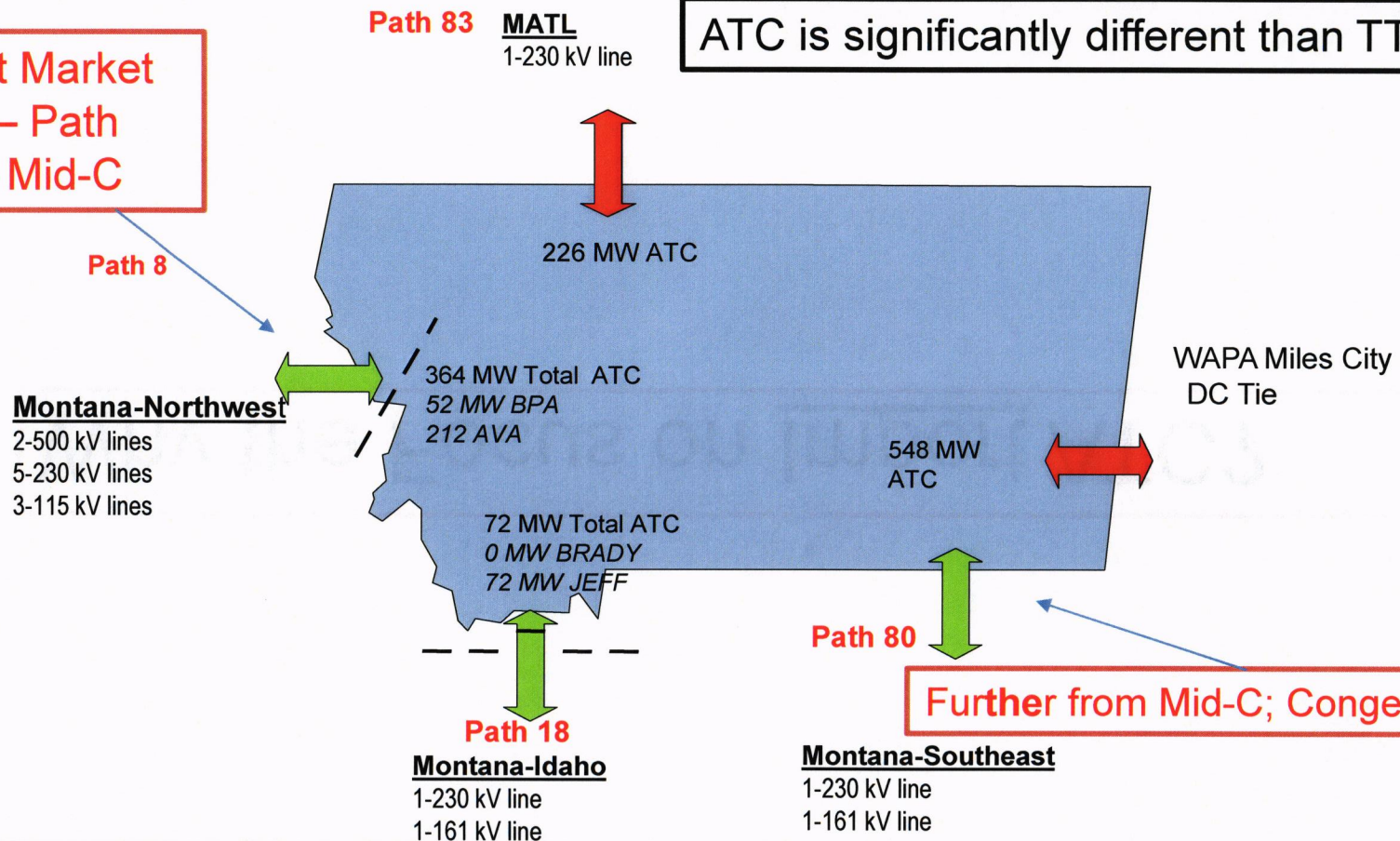




# Long-Term Import ATC – June 2019

ATC is significantly different than TTC

Greatest Market Access – Path 8/BPA – Mid-C



Without Long-Term Reservations, ATC can not be guaranteed for short-term use





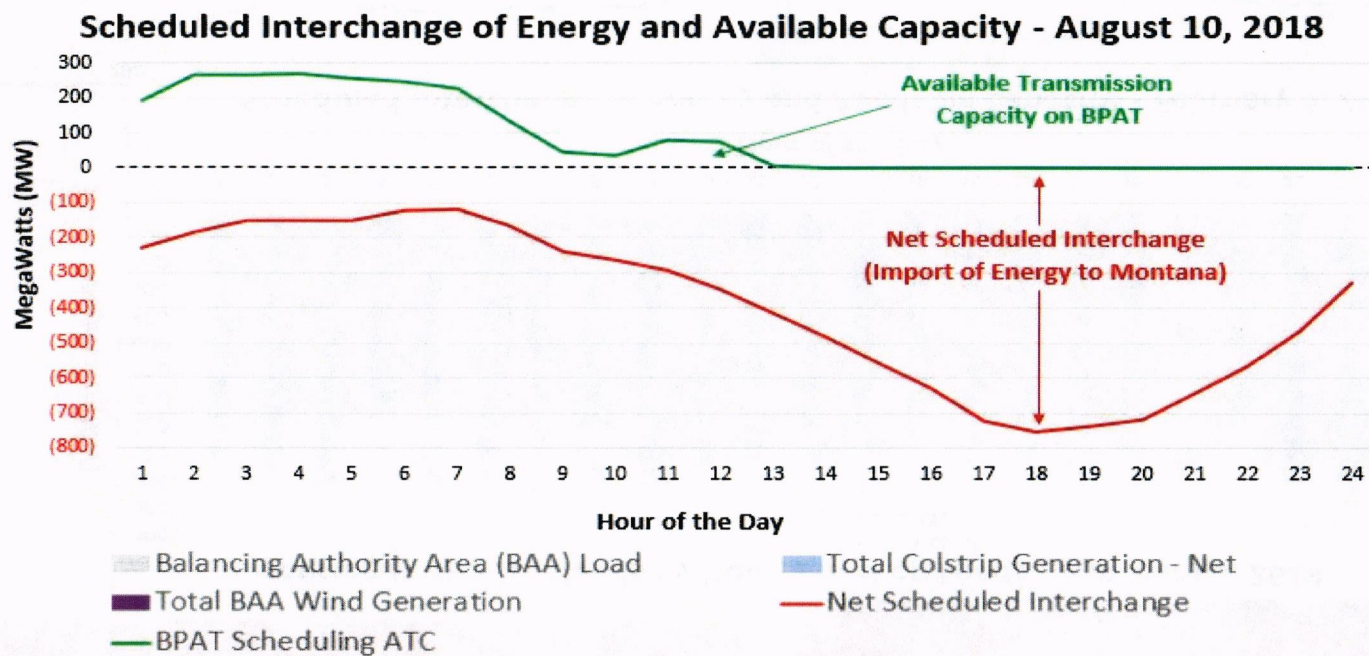
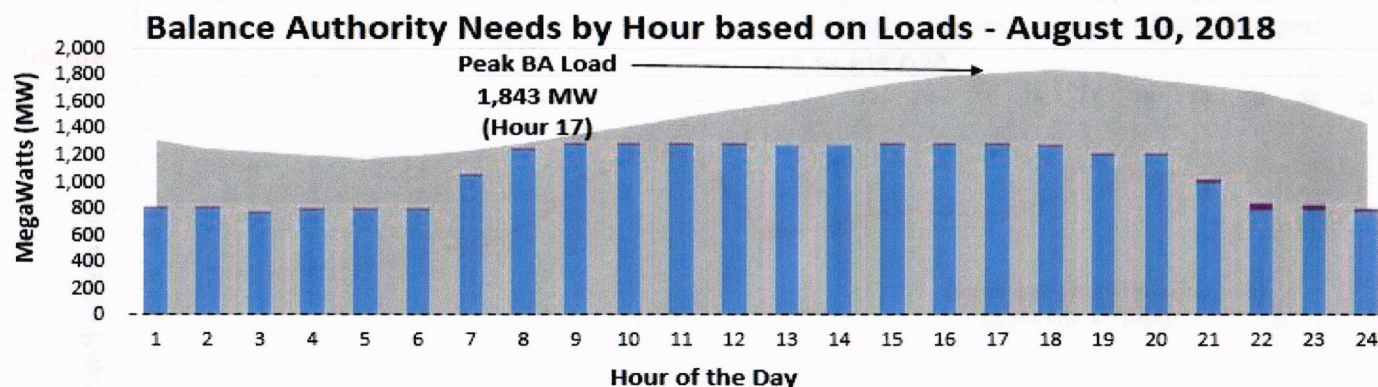
# Electric Transmission Reliability

## Why the Focus on Import ATC?





# August 10, 2018

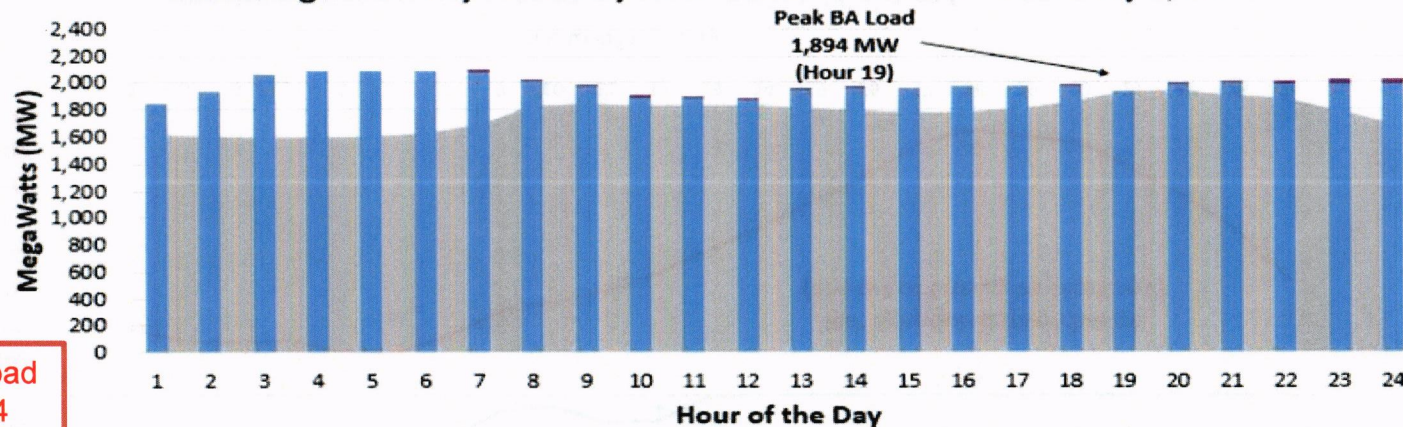






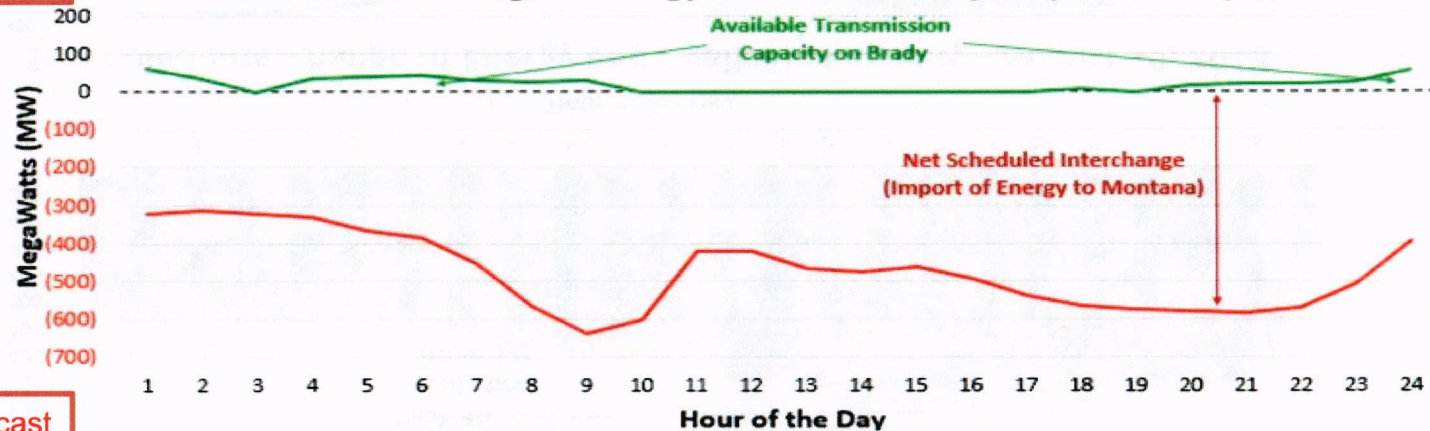
# February 5, 2019

## Balancing Authority Needs by Hour based on Loads - February 5, 2019



New Peak Load  
8/5/19 – 1904  
MW

## Scheduled Interchange of Energy and Available Capacity - February 5, 2019



WECC Forecast  
– 96% of  
Regional Peak

■ Balancing Authority Area (BBA) Load  
■ Total Colstrip Generation - Net  
■ Total BAA Wind Generation  
■ Net Scheduled Interchange  
■ Brady Scheduling ATC

For the full day on February 5, 2019, with good generation from Colstrip, but little generation from Wind in Montana, there was a continuous import of energy (Net Scheduled Interchange) - red line above - to meet energy demands. The green line shows there was some available transmission capacity earlier in the day but little to no availability from Brady in Idaho during the peak hours (hours 8-22).

thWestern  
Energy  
Delivering a Bright Future





# Market Volatility







# What About Contingencies?



2/5/19 - 190 MW drop in supply due to transmission curtailments of supply coming from Wyoming/Colorado area. Fortunately, the curtailment was not lengthy – but posed significant risk to reliable operation.





# Takeaways and Concerns

- Import Capability from the most liquid market is very limited
  - Causes include: Increasing peak loads (new peak BA load records),  
Reduced Montana dispatchable generation
- NorthWestern and other loads in the NorthWestern BAA rely heavily on import capability to meet peak needs.
  - Over **80%** of Imports on 8/10/18 and **100%** of Imports on 8/11/19 came from Path 8
  - During Peaks, ATC is scarce and routinely zero from BPA
  - During the heaviest load hours of 8/10/18, **400 MW** were being imported to serve retail customers – represents **over 30%** of the retail customer load
- Concern about long-term generation reductions/retirements
  - Colstrip 1&2 accelerated shutdown in January 2020
- Intermittent generation does not materially contribute to resources needed to meet peak requirements
- Over reliance on market purchases from outside the BAA can result in significant reliability issues compared to relying on flexible capacity resources within the BAA
- Experience and Data from 2/5/2019 reinforces these concerns
- Final Thought – Regional Resource Adequacy